US011610425B2

(12) **United States Patent**
Baker

(10) **Patent No.: US 11,610,425 B2**
(45) **Date of Patent: Mar. 21, 2023**

(54) **FINGERPRINT SENSOR CONTROLS BASED ON OPERATING STATES**

(71) Applicant: **Hewlett-Packard Development Company, L.P.**, Spring, TX (US)

(72) Inventor: **Abu Mohammed Ali Baker**, Spring, TX (US)

(73) Assignee: **HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.**, Spring, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/052,323**

(22) PCT Filed: **Nov. 5, 2018**

(86) PCT No.: **PCT/US2018/059168**
§ 371 (c)(1),
(2) Date: **Nov. 2, 2020**

(87) PCT Pub. No.: **WO2020/096562**
PCT Pub. Date: **May 14, 2020**

(65) **Prior Publication Data**

US 2021/0256241 A1 Aug. 19, 2021

(51) **Int. Cl.**
G06V 40/13 (2022.01)
G06F 1/32 (2019.01)
G06F 13/40 (2006.01)

(52) **U.S. Cl.**
CPC ***G06V 40/13*** (2022.01); ***G06F 1/32*** (2013.01); *G06F 13/4068* (2013.01)

(58) **Field of Classification Search**
CPC G06V 40/13; G06F 1/32; G06F 13/4068
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,690,030 B1 3/2010 Ma et al.
9,460,334 B2 10/2016 Lan et al.
9,836,592 B2 12/2017 Huang et al.
(Continued)

FOREIGN PATENT DOCUMENTS

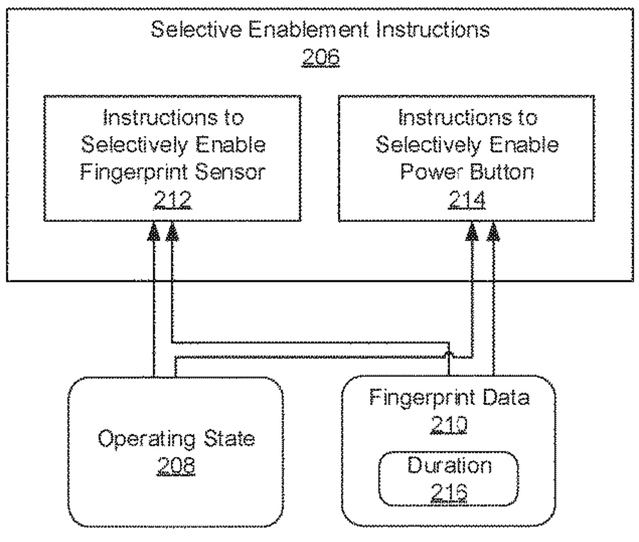
CN 107820598 3/2018
WO 2018/064886 A1 4/2018
WO WO-2018063258 4/2018

Primary Examiner — Abhishek Sarma
(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear, LLP

(57) **ABSTRACT**

An example non-transitory machine-readable storage medium includes instructions to disambiguate a finger touch at a fingerprint sensor device. When executed, the instructions cause a processor of a computing device to identify an operating state of the computing device when the computing device is powered on. The operating state includes a powered-on state of the computing device. The instructions further cause the processor to obtain fingerprint data from the fingerprint sensor device, the fingerprint sensor device including a fingerprint sensor to read a fingerprint and a power button to alter the operating state of the computing device. The instructions further cause the processor to selectively enable the fingerprint sensor based on the operating state and selectively enable the power button based on the operating state to disambiguate the finger touch at the fingerprint sensor device.

17 Claims, 9 Drawing Sheets



400

Operating State							Fingerprint Sensor Device		
Powered-Off	Standby	Login Screen	Desktop	SSO Enabled	Lid Closed	FPS Reacy-to-Capture	Fingerprint Scanning	WOF	Power Button Enabled
0	0	0	1	...	0	1	...	...	0
...	...	0	0	...	1	0	...	0	...
0	1	0	0	...	0	0	0	...	...
0	1	0	0	1	...	0	0	...	...
...	...	...	...	...	...	...	...	...	...

402
404
406
408

(56) **References Cited**

U.S. PATENT DOCUMENTS

9,967,100	B2	5/2018	Hong et al.	
2009/0278807	A1	11/2009	Hu	
2009/0315675	A1	12/2009	Yokota	
2012/0019356	A1	1/2012	Gagneraud et al.	
2013/0159690	A1	6/2013	Tsukamoto et al.	
2015/0199554	A1	7/2015	Merrell et al.	
2017/0147800	A1	5/2017	Huang et al.	
2019/0213384	A1*	7/2019	Lu	G06V 40/1365
2019/0311175	A1	10/2019	Zhang et al.	

* cited by examiner

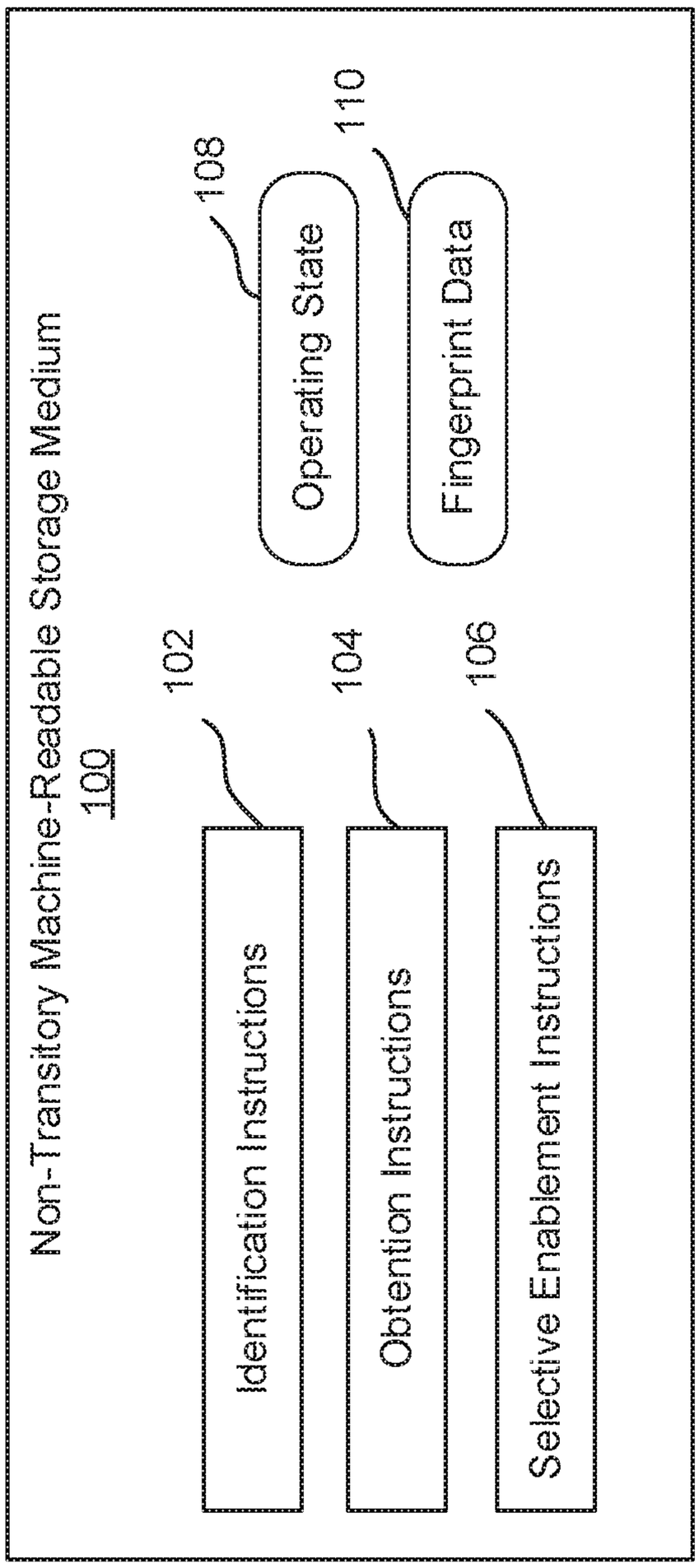

Non-Transitory Machine-Readable Storage Medium
100
Identification Instructions
102
Obtention Instructions
104
Selective Enablement Instructions
106
Operating State
108
Fingerprint Data
110

FIG. 1

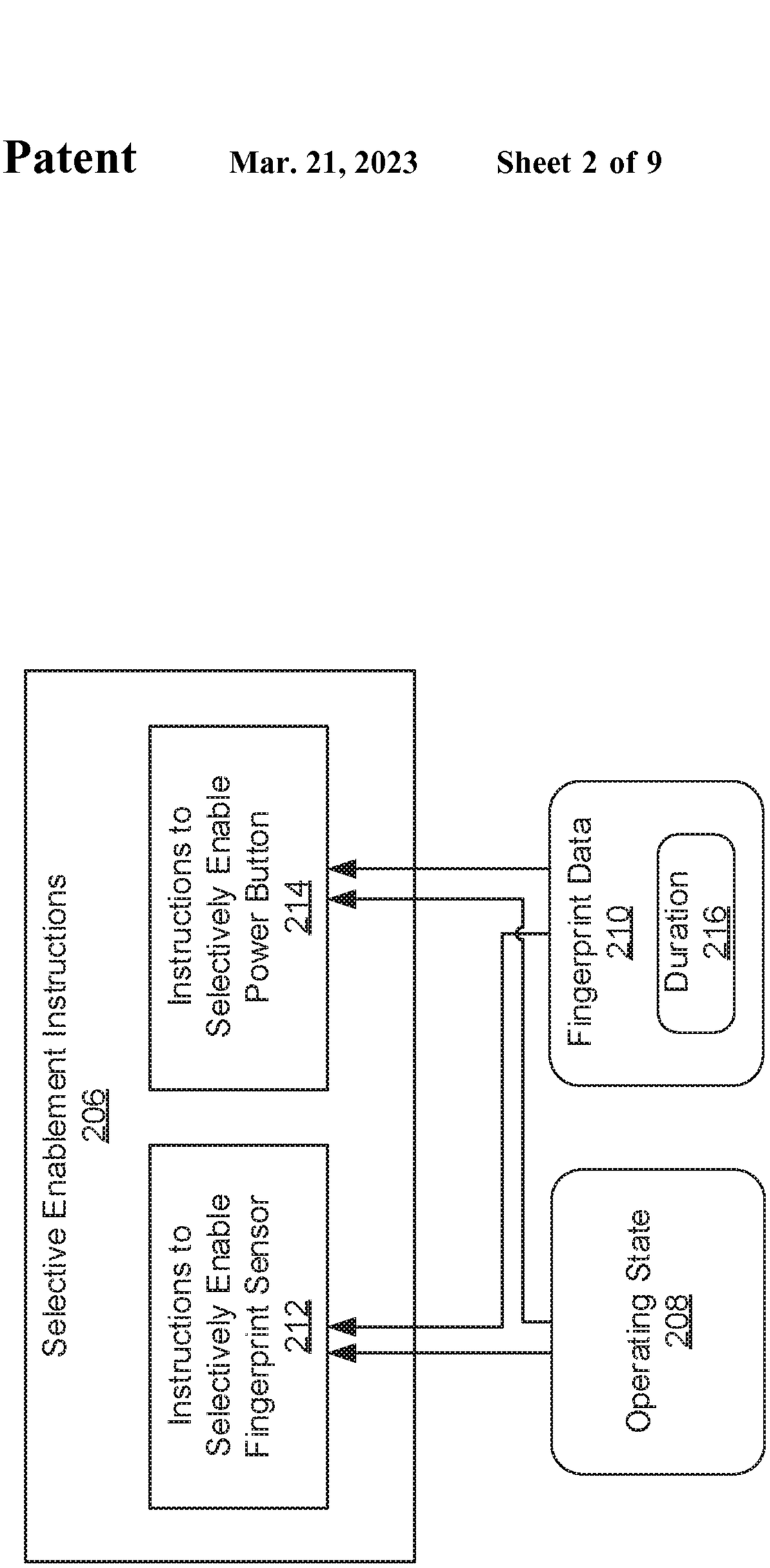

Selective Enablement Instructions
206
Instructions to Selectively Enable Fingerprint Sensor
212
Instructions to Selectively Enable Power Button
214
Operating State
208
Fingerprint Data
210
Duration
216

FIG. 2

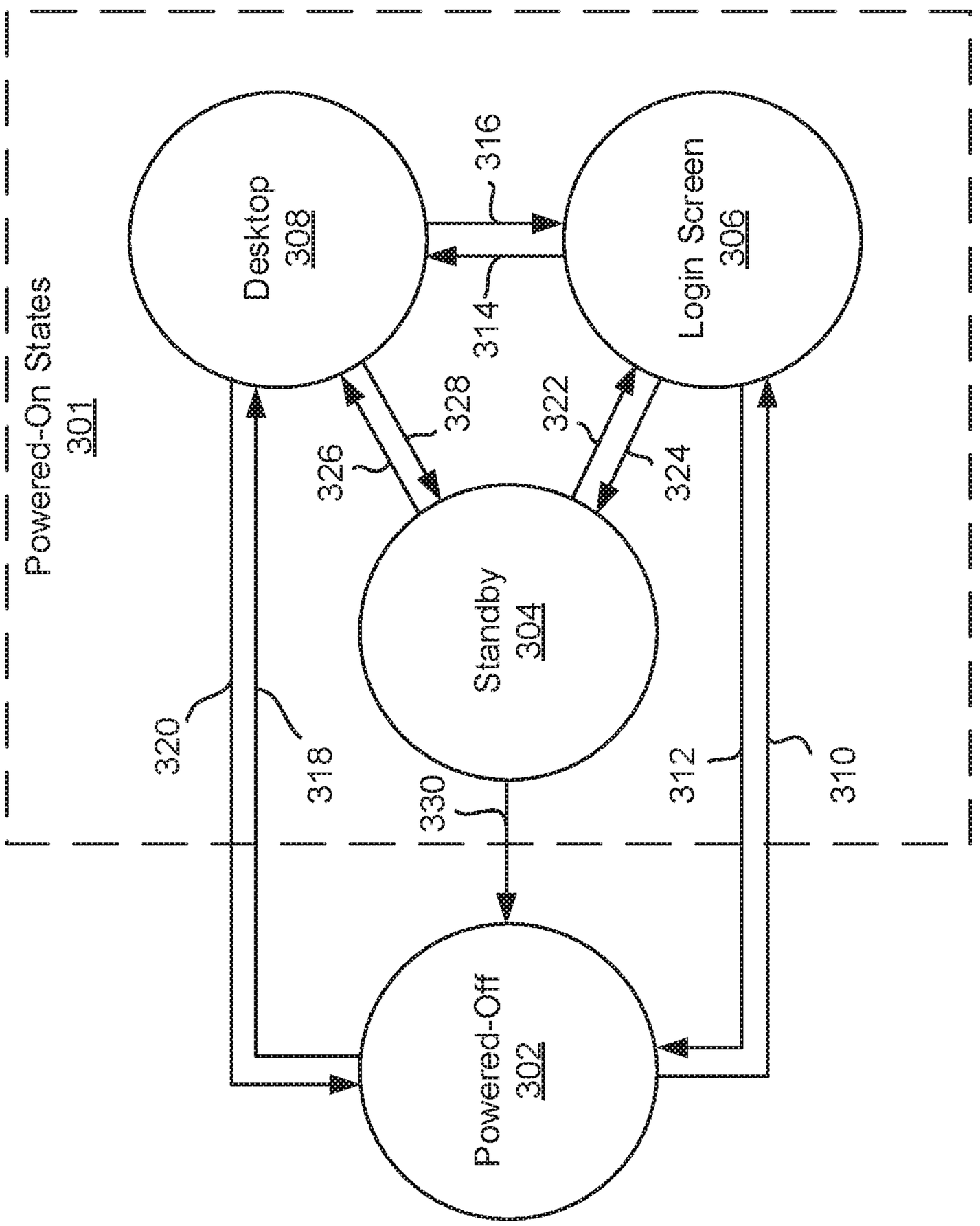

300
Powered-On States
301
Desktop
308
Login Screen
306
Standby
304
Powered-Off
302
316
314
328
326
322
324
320
318
330
312
310

FIG. 3A

300

Current State \ Next State	Powered-Off 302	Standby 304	Login Screen 306	Desktop 308
Powered-Off 302	-	-	310 Duration > 4s	318 BP Pressed & SSO Enabled
Standby 304	330 Duration > 4s	-	322 4s > Duration > 1s	326 WOF Enabled & Match = true
Login Screen 306	312 Duration > 4s	324 4s > Duration > 1s	-	314 Match = true
Desktop 308	320 Duration > 4s	328 4s > Duration > 1s	316 Log Off	-

FIG. 3B

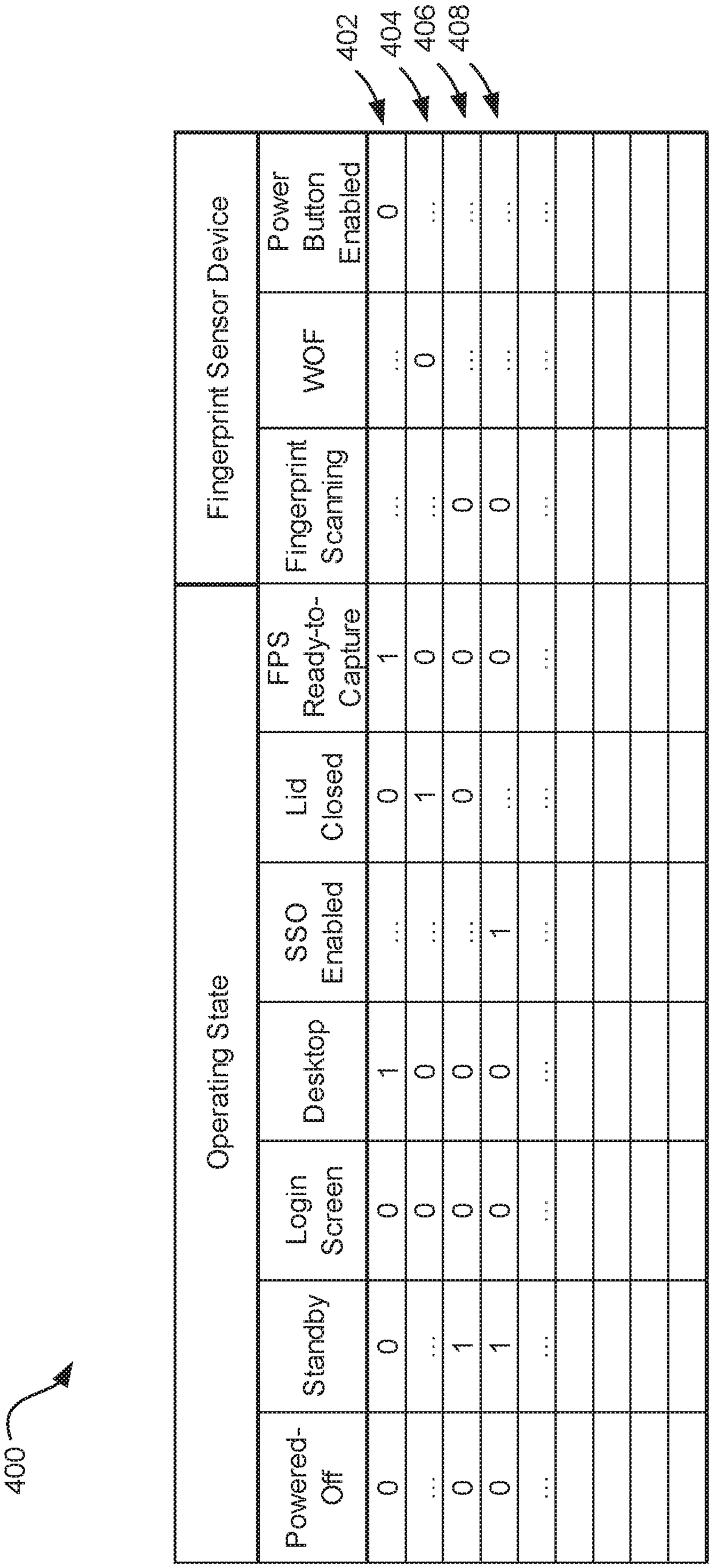

400
402
404
406
408
Operating State
Powered-Off
Standby
Login Screen
Desktop
Fingerprint Sensor Device
Power Button Enabled
WOF
SSO Enabled
Lid Closed
FPS Ready-to-Capture
Fingerprint Scanning

FIG. 4

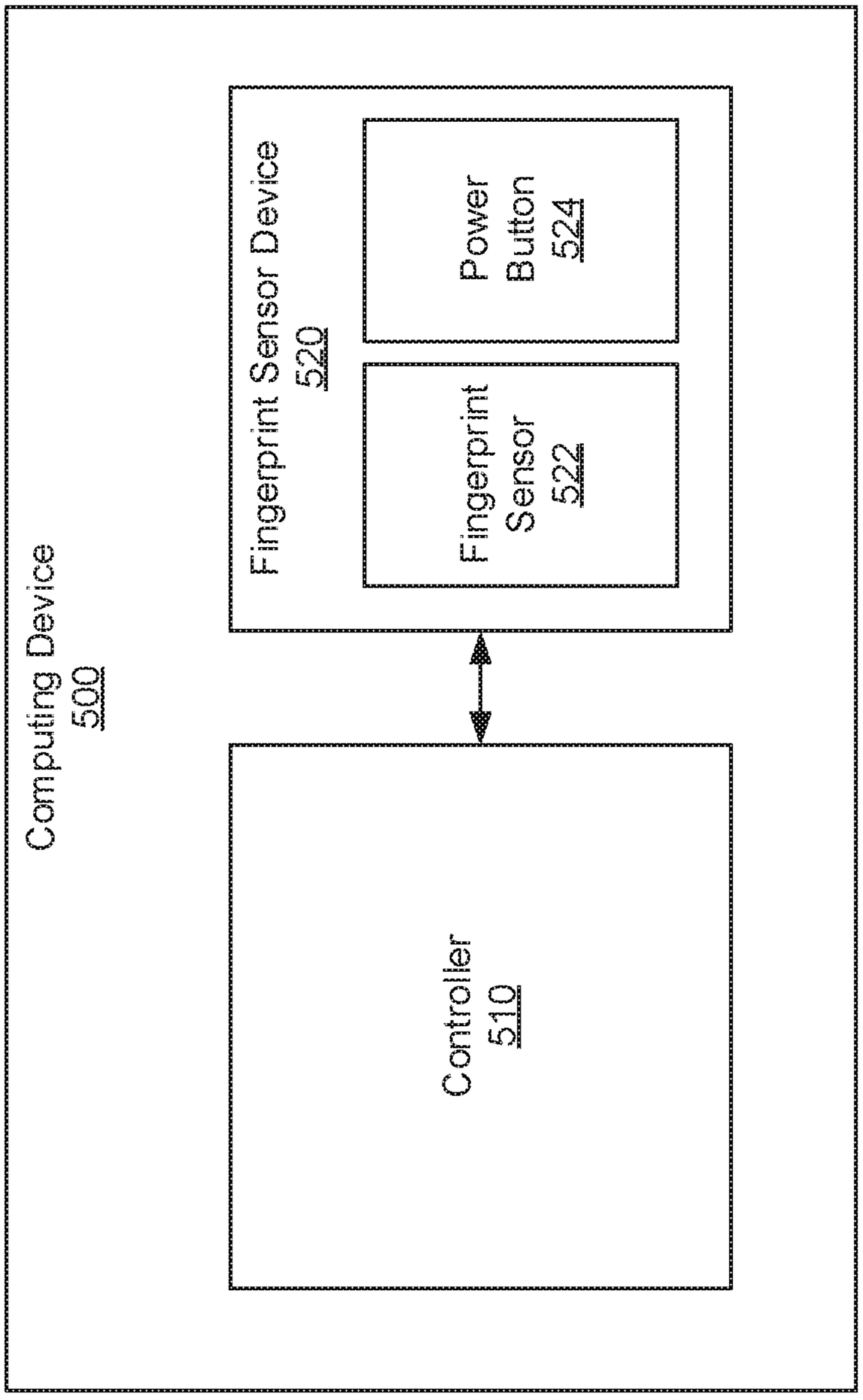

Computing Device
500
Controller
510
Fingerprint Sensor Device
520
Fingerprint
Sensor
522
Power
Button
524

FIG. 5

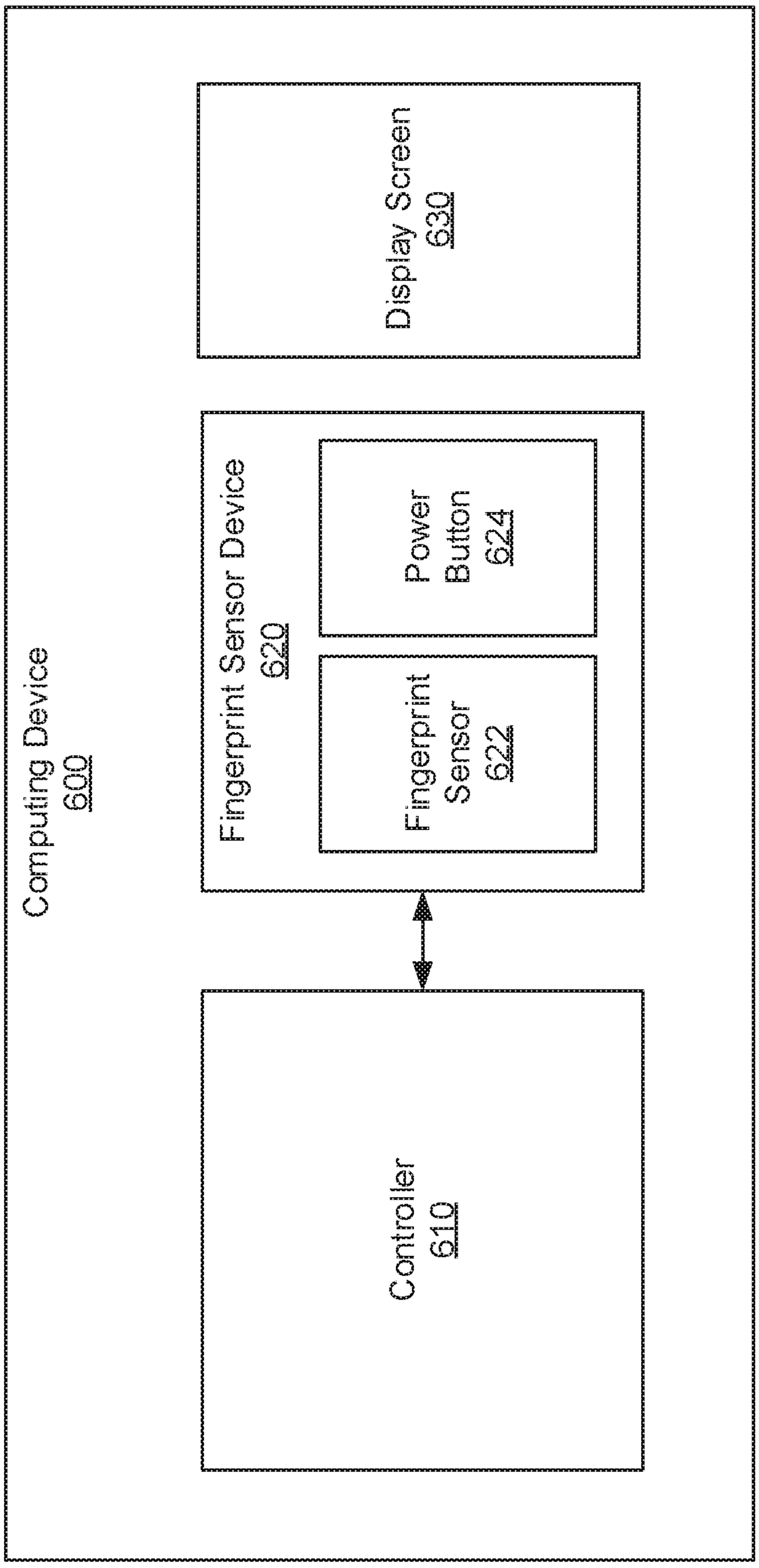

Computing Device
600
Display Screen
630
Fingerprint Sensor Device
620
Power Button
624
Fingerprint Sensor
622
Controller
610

FIG. 6

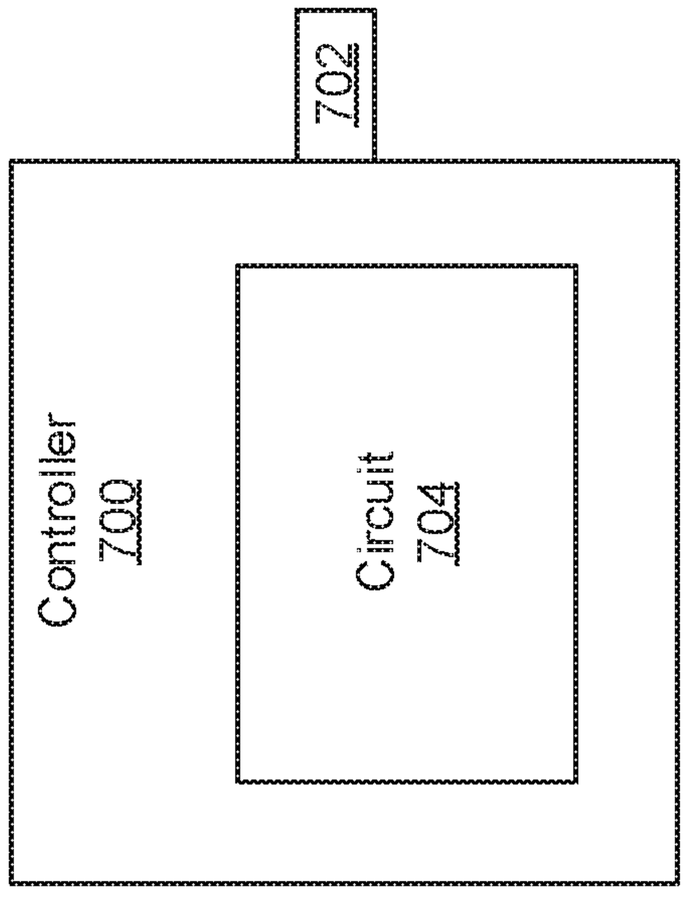


FIG. 7

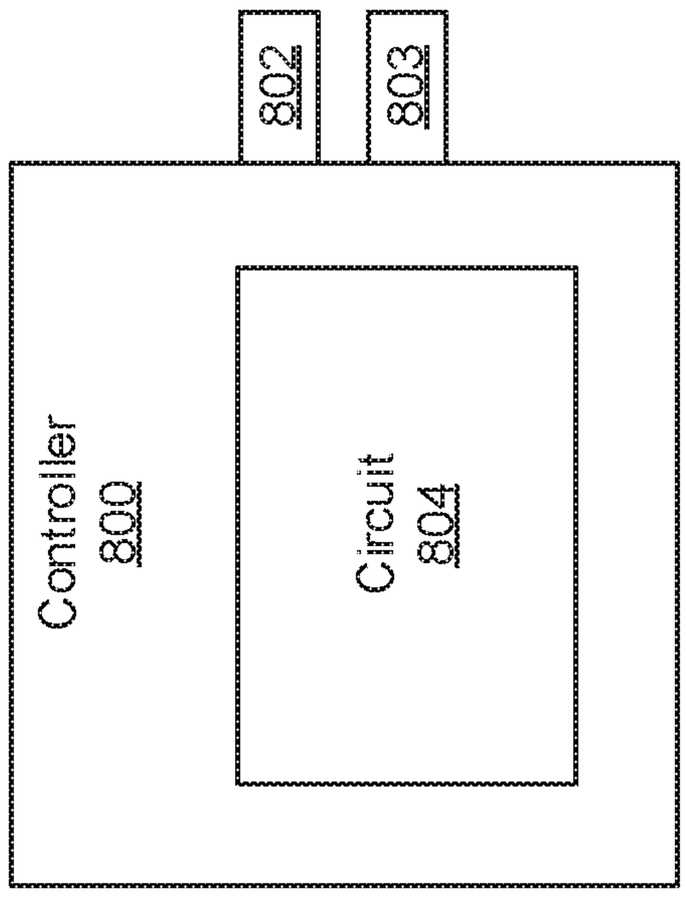


FIG. 8

FINGERPRINT SENSOR CONTROLS BASED ON OPERATING STATES

BACKGROUND

A computing device may include a fingerprint sensor to scan a users fingerprint. A users fingerprint may be used by an operating system or software application for an authentication purpose, or to sign the user into a user account at the computing device. A fingerprint sensor may be integrated with a power button of the computing device to allow a user to simultaneously wake the computing device and sign the user into the users account with a single touch.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of an example non-transitory machine-readable storage medium. The storage medium stores instructions to cause a processor of a computing device to execute tasks to selectively enable a fingerprint sensor of a fingerprint sensor ("FPS") device and selectively enable a power button of the FPS device.

FIG. **2** is a schematic diagram showing example instructions to selective enable a fingerprint sensor and a power button of an FPS device.

FIG. **3**A is a state diagram showing an example behavioral system of a computing device showing operating states of the computing device and transition pathways between the operating states.

FIG. **3**B is a state transition table representation of the state diagram of FIG. **3**A showing transition conditions for the computing device to transition between operating states.

FIG. **4** is a table of example instructions to selectively enable a fingerprint sensor and a power button of an FPS device based on an operating state of a computing device.

FIG. **5** is a schematic diagram of an example computing device including a controller to selectively enable a fingerprint sensor and a power button of an FPS device.

FIG. **6** is a schematic diagram of another example computing device **600** including a controller to selectively enable a fingerprint sensor and a power button of an FPS device.

FIG. **7** is a schematic diagram of an example controller to selectively enable a fingerprint sensor and a power button of an FPS device.

FIG. **8** is a schematic diagram of another example controller to selectively enable a fingerprint sensor and a power button of an FPS device.

DETAILED DESCRIPTION

Fingerprint sensors may be integrated with power buttons on computing devices, such as notebook computers, to provide a convenient way for a user to change an operating state of a computing device with a single user interface component. For example, a user may shut down, wake up, login, or logout of the computing device using the integrated fingerprint sensor-power button. An integrated fingerprint sensor-power button may be referred to herein as a fingerprint sensor ("FPS") device. An FPS device may include an optical, capacitive, or similar type of scanner built into a button, which may be responsive to touch or a physical press by a finger tip.

A user may wish to use an FPS device for a fingerprint scanning purpose only, such as to scan a fingerprint to provide authentication to an application running on the computing device. In other instances, a user may wish to use an FPS device only to alter an operating state of a computing device, such as when the user wishes to press the FPS device to shut down the computing device. Further, in other instances, an FPS device may allow a user to use the power button and a feature of the fingerprint sensor simultaneously with a single touch. For example, a user may touch an FPS device to both wake a computing device from a sleep state and sign into the user's account associated with the computing device.

Although convenient, a fingerprint sensor integrated with a power button may be prone to accidental or unintentional use. For example, a user using the computing device in a powered-on state may accidentally shut down the computing device by an accidental press of an FPS device. Further, an FPS device may misinterpret an attempt to scan a fingerprint as an attempt to shut down the computing device. As another example, a user may accidentally wake up a computing device from a low-power state by accidentally touching the FPS device while carrying the computing device.

Accidental or unintentional use of an FPS device may be mitigated by identifying an operating state of the computing device, including a powered-on state of the computing device, and selectively enabling the fingerprint sensor and the power button of the FPS device based on an operating state of the computing device.

A non-transitory machine-readable storage medium may include instructions that, when executed, cause a processor of a computing device to identify an operating state of the computing device when the computing device is powered on. The operating state may include a powered-on state of the computing device. The instructions may further cause the processor to obtain fingerprint data from an FPS device, the FPS device including a fingerprint sensor to read a fingerprint and a power button to alter the operating state of the computing device. The instructions may further cause the processor to selectively enable the fingerprint sensor based on the operating state and selectively enable the power button based on the operating state to disambiguate a finger touch at the FPS device.

Selectively enabling the fingerprint sensor may include disabling the fingerprint sensor based on the operating state of the computing device.

Selectively enabling the power button may include disabling the power button based on the operating state of the computing device. The operating state may include a powered-on state of the computing device, such as whether the computing device is in a low-power state such as a sleep state, or in a full-power state. The operating state may also include a login state of the computing device, such as whether a user account is authenticated to be signed into the computing device. Further, the fingerprint data may include a duration of the finger touch at the FPS device, and instructions may dictate that the fingerprint sensor is to be disabled when the duration of the finger touch is within a range corresponding to altering the operating state of the computing device and the computing device is in a low-power state. Further, instructions may dictate that the fingerprint sensor is to be disabled when the duration of the finger touch is within a range corresponding to a fingerprint scan and the computing device is in a full-power state. The instructions may thereby disambiguate a finger touch of an FPS device and mitigate accidental or unintentional use of the FPS device.

FIG. **1** is a schematic diagram of an example non-transitory machine-readable storage medium **100** which stores such instructions. The instructions cause a processor of a computing device to execute tasks to disambiguate a

finger touch at an FPS device of the computing device. The computing device may include a notebook computer, desktop computer, smartphone, or any suitable computing device which includes an FPS device and a non-transitory machine-readable storage medium.

The medium **100** includes identification instructions **102** to cause the processor of the computing device to identify an operating state **108** of the computing device when the computing device is powered on. The operating state **108** includes a powered-on state of the computing device. Further, a powered-on state may indicate whether the computing device is in a low-power state, such as a sleep state, or in a full-power state for when the computing device is being actively used by a user. The operating state may also include a login state of the computing device, such as whether a user account is authenticated to be signed into the computing device. The operating state may further include a setting of the computing device or of the FPS device, such as whether a single-sign-on feature is enabled, whether a wake-on-fingerprint feature is enabled, whether the FPS device is in a ready-to-scan state, and whether a lid of the computing device is closed.

The medium **100** further includes obtention instructions **104** to cause the processor of the computing device to obtain fingerprint data **110** from an FPS device. The FPS device includes a fingerprint sensor to read a fingerprint and a power button to alter the operating state **108** of the computing device. The fingerprint data includes data transmitted from the FPS device, which may include whether the FPS device is pressed, the duration of a touch of the FPS device, and whether the fingerprint scanner of the FPS device has detected a matching fingerprint which would authenticate a login to a user account associated with the computing device.

The medium **100** further includes selective enablement instructions **106** to selectively enable the fingerprint sensor based on the operating state **108** and selectively enable the power button based on the operating state **108** to disambiguate a finger touch at the FPS device. The selective enablement instructions **106** may include instructions to disable or enable one or both of the fingerprint sensor and the power button of the FPS device based on an operating state of the computing device. In some examples, the selective enablement instructions **106** may include instructions to disable or enable one or both of the fingerprint sensor and the power button of the FPS device based on a combination of an operating state of the computing device and the fingerprint data.

FIG. **2** is a schematic diagram showing example selective enablement instructions **206**. The selective enablement instructions **206** may be similar to the selective enablement instructions **106**, and thus may be stored on a non-transitory machine-readable storage medium, along with identification instructions to identify an operating state **208** of a computing device, and obtention instructions to obtain fingerprint data **210** from an FPS device of the computing device. For further description of the above elements, the description of the medium **100** of FIG. **1** may be referenced.

The selective enablement instructions **206** may include instructions **212** to selectively enable the fingerprint sensor of the FPS device. In some examples, the instructions **212** may include disabling a feature of the fingerprint sensor based on the operating state **208** of the computing device. For example, where the computing device includes a closable lid, such as in the case of a notebook or laptop, instructions **212** may disable a wake-on-fingerprint feature of the FPS device when the lid of the computing device is closed.

The selective enablement instructions **206** may include instructions **214** to selectively enable a power button of the FPS device. In some examples, the instructions **214** may include disabling the power button based on the operating state **208** of the computing device. For example, instructions **214** may block the power button from lower the power state of the computing device when a software application has requested fingerprint authentication and the operating state **208** includes an indication that the fingerprint sensor of the FPS device is in a ready-to-capture state.

In some examples, the fingerprint data **210** may include a duration **216** of the finger touch at the FPS device. Further, the instructions **212** may dictate that a feature of the fingerprint sensor is to be disabled when the duration **216** of the finger touch is within a range corresponding to altering the operating state of the computing device and the computing device is in a low-power state, or in other words, when the finger touch at the FPS device was intended to alter the operating state **208** of the computing device. For example, instructions **212** may block a fingerprint scanning feature of a fingerprint scanner of an FPS device from scanning a fingerprint of a finger touch when the computing device is in a low-power state unless a single-sign-on feature is enabled and a duration of the finger touch of the FPS device is greater than a threshold duration.

Further, the instructions **214** may dictate that the power button is to be disabled when the duration **216** of the finger touch is within a range corresponding to a fingerprint scan and the computing device is in a full-power state, or in other words, when the finger touch at the FPS device was intended for a scanning purpose. Example instructions for determining whether a finger touch at the FPS device was intended for a scanning purpose or to alter the operating state **208** of the computing device are described with reference to FIG. **4**. For example, instructions **214** may block a power button of an FPS device from lowering a power state of the computing device while the FPS device is in a ready-to-capture mode unless the FPS device is pressed for a duration greater than a threshold duration.

FIG. **3**A is a state diagram showing an example behavioral system **300** of a computing device. The computing device may be similar to the computing device referred to in FIG. **1**, and may store instructions similar to the instructions described therein.

The behavioral system **300** includes operating states of the computing device, including a powered-off state **302** (e.g., an S5 state according to the Advanced Configuration and Power Management Interface or ACPI specification), a standby state **304** (e.g., and S3 or M5 ACPI state), a login screen state **306** (e.g., an S0 ACPI state), and a desktop state **308** (e.g., an S0 ACPI state). The behavioral system **300** further includes transition pathways between the operating states which may be executed when corresponding transition conditions are met.

The computing device may transition from the powered-off state **302** to the login screen state **306** when a transition condition of a transition pathway **310** is met. The computing device may transition from the login screen state **306** to the powered-off state **302** when a transition condition of transition pathway **312** is met.

Further, the computing device may transition from the login screen state **306** to the desktop state when a transition condition of the transition pathway **314** is met. The computing device may transition from the desktop state **308** to

the login screen state **306** when a transition condition of the transition pathway **316** is met.

Further, the computing device may transition from the desktop state **308** to the powered-off state **302** when a transition condition of the transition pathway **318** is met. The computing device may transition from the powered-off state **302** to the desktop state **308** when a transition condition of the transition pathway **320** is met.

Further, the computing device may transition from the standby state **304** to the login screen state **306** when a transition condition of the transition pathway **322** is met. The computing device may transition from the login screen state **306** to the standby state **304** when a transition condition of the transition pathway **324** is met.

Further, the computing device may transition from the standby state **304** to the desktop state **308** when a transition condition of the transition pathway **326** is met. The computing device may transition from the desktop state **308** to the standby state **304** when a transition condition of the transition pathway **328** is met.

Further, the computing device may transition from the standby state **304** to the powered-off state **302** when a transition condition of the transition pathway **330** is met.

The transition pathways **310**, **312**, **314**, **316**, **318**, **320**, **322**, **324**, **326**, **328**, and **330**, are executed when a corresponding transition condition is satisfied.

A transition condition may be based on an operating state of the computing device, including a power state of the computing device. A power state of the computing device may include a powered-off state **302** or a powered-on state **301**. A powered-on state **301** may include the standby state **304**, the login screen state **306**, and the desktop state **308**. Further, a transition condition may be based on a further operating state of the computing device, such as the operating states discussed above. Further, a transition condition may be based on fingerprint data, or on a combination of fingerprint data and an operating state of the computing device.

FIG. **3**B is a state transition table representing the example behavioral system **300** of FIG. **3**A. The cells of the state transition table provide example transition conditions which satisfy transition pathways **310**, **312**, **314**, **316**, **318**, **320**, **322**, **324**, **326**, **328**, and **330**, respectively. Thus, for example, the transition pathway **310** is to be executed to transition the computing device from a powered-off state **302** to a login screen state **306** when the duration of a touch of the FPS device is greater than, for example, four seconds, or another example threshold duration. As another example, the transition pathway **318** is to be executed to transition the computing device from the powered-off state **302** to the desktop state **308** when the power button of the FPS device is pressed and the single-sign-on feature is enabled. As another example, the transition pathway **322** is to be executed to transition the computing device from the standby state **304** to the login screen state **306** when the duration of a touch of the FPS device is between, for example, one and four seconds, or another example window of time. As another example, the transition pathway **326** is to be executed to transition the computing device from the standby state **304** to the desktop state **308** when a wake-on-fingerprint feature is enabled, and the fingerprint sensor of the FPS device has detected a matching fingerprint. Other example transition conditions are contemplated.

Transitions between operating states of the computing device may be limited by instructions which selectively enable the fingerprint sensor and selectively enable the power button according to an operating state of the computing device, or a combination of an operating state of the computing device and fingerprint data. Such instructions may disambiguate a finger touch of the FPS device and mitigate accidental or unintentional use of the FPS device.

FIG. **4** is a table showing an example table **400** including such instructions. The table **400** includes instructions to selectively enable the fingerprint sensor of an FPS device and to selectively enable the power button of an FPS device based on an operating state of a computing device. An instruction may be represented as a row in the table, where a "1" in a cell under an operating state column indicates that the operating state of the computing device includes the corresponding operating state of the column, and a "0" indicates that the operating state of the computing device does not include the corresponding operating state of the column. Further, a "1" in a cell under a fingerprint sensor device column indicates that the corresponding feature of the FPS device is enabled, and a "0" indicates that the corresponding feature of the FPS device is disabled. Ellipses (" . . . ") indicate that an instruction is agnostic as to the operating state or the enabled/disabled state of the feature of the FPS device.

For example, instruction **402** dictates that that the power button is to be disabled when the computing device is in a full-power (e.g. "desktop") state and the fingerprint sensor is in a ready-to-capture state.

As another example, instruction **404** dictates that a wake-on-fingerprint feature of the fingerprint sensor is to be disabled when a lid of the computing device is closed.

As another example, instruction **406** dictates that a scanning feature of the fingerprint sensor is to be disabled when the computing device is in a low-power (e.g. standby) state.

As another example, instruction **408** dictates that a scanning feature of the fingerprint sensor is to be disabled when a single-sign-on setting is enabled and the computing device is in a low-power (e.g. standby) state.

In other examples, an instruction may dictate that based on another combination of operating states, one or both of the power button and a feature of the fingerprint sensor are to be enabled or disabled. Other operating states on which an instruction may be based include a login state login state of a user account associated with the computing device.

FIG. **5** is a schematic diagram of an example computing device **500** including a controller to selectively enable a fingerprint sensor and a power button of an FPS device. The computing device **500** includes an FPS device **520**. The FPS device **520** includes a fingerprint sensor **522** to read a fingerprint and a power button **524** to alter an operating state of the computing device **500**.

The computing device **500** further includes a controller **510** to identify an operating state of the computing device **500**, where the operating state includes a powered-on state of the computing device **500**. The controller **510** is further to obtain fingerprint data from the FPS device **520** based on a finger touch at the FPS device **520**. The controller **510** is further to selectively enable the fingerprint sensor **522** based on the operating state and selectively enable the power button **524** based on the operating state to disambiguate the finger touch at the FPS device **520**. Selectively enabling the fingerprint sensor **522** and selectively enabling the power button **524** may be based on instructions such as those described in the table **400** of FIG. **4**.

FIG. **6** is a schematic diagram of another example computing device **600** including a controller to selectively enable a fingerprint sensor and a power button of an FPS device. The computing device **600** is similar to the computing device **500** of FIG. **5**, and includes a controller **610** and

an FPS device **620** including a fingerprint sensor **622** and power button **624**. For further description of the above elements, the description of the computing device **500** of FIG. **5** may be referenced.

The computing device **600** further includes a display screen **630**. Further, the operating state of the computing device **600** may include a power setting of the display screen **630**. Thus, for example, instructions to selectively enable the fingerprint sensor **622** and selectively enable the power button **624** may be based on whether the display screen **630** is lit, dimmed, or off.

FIG. **7** is a schematic diagram of an example controller **700** to selectively enable a fingerprint sensor and a power button of an FPS device. The controller **700** includes a pin **702** to communicate with an FPS device of a computing device, where the FPS device includes a fingerprint sensor to read a fingerprint and a power button to alter an operating state of the computing device. The operating state includes a powered-on state of the computing device. In some examples, the pin **702** may include a general-purpose input/output (GPIO) pin.

The controller **700** further includes a circuit **704** to identify the operating state of the computing device, obtain fingerprint data from the FPS device based on a finger touch at the FPS device, selectively enable the fingerprint sensor based on the operating state, and selectively enable the power button based on the operating state, to disambiguate the finger touch at the FPS device.

FIG. **8** is a schematic diagram of another example controller **800** to disambiguate a finger touch of an FPS device. The controller **800** is similar to the controller **700** of FIG. **7**, and includes a pin denoted as a first pin **802**, and a circuit **804**. For further description of the above elements, the description of the controller **700** of FIG. **7** may be referenced. Further, the controller **800** includes a second pin **803** to communicate with an FPS device of a computing device. Thus, certain communication tasks may be delegated between the first pin **802** and the second pin **803**. For example, the first pin **802** may receive fingerprint data from the FPS device, and the second pin **803** may selectively enable the fingerprint sensor and the power button of the FPS device. Thus, the first pin **802** may receive fingerprint data from the fingerprint sensor device, and the circuit **804** may use the fingerprint data to determine when to selectively enable the fingerprint sensor of the fingerprint sensor device or the power button of the fingerprint sensor device.

Thus, accidental or unintentional use of an FPS device may be mitigated by the instructions, computing device, and controller described herein. Basing instructions for selectively enabling a fingerprint sensor and a power button of an FPS device on an operating state of a computing device allows for the development of a diverse set of instructions to be implemented to suit different use cases. Further, basing the instructions on fingerprint data received from the FPS device provides rang and flexibility to the set of instructions. Thus, the intention of a finger touch at an FPS device may be disambiguated.

Moreover, disambiguating a finger touch at an FPS device may prevent accidental shut down of a computing device, which mitigates against lost data and lost productivity which may be caused by a user accidentally shutting down the computing device. Further, disambiguating a finger touch at an FPS device may prevent a user from accidentally powering on a computing device, thereby conserving energy.

The scope of the claims should not be limited by the above examples, but should be given the broadest interpretation consistent with the description as a whole.

The invention claimed is:

1. A non-transitory machine-readable storage medium comprising instructions that when executed cause a processor of a computing device to:

identify an operating state of the computing device when the computing device is powered on, the operating state including a powered-on state of the computing device;

obtain fingerprint data from a fingerprint sensor device, the fingerprint sensor device including a fingerprint sensor to read a fingerprint and a power button to alter the operating state of the computing device; and

selectively enable the fingerprint sensor based on the operating state and selectively enable the power button based on the operating state to disambiguate a finger touch at the fingerprint sensor device, wherein to selectively enable the fingerprint sensor includes disabling a feature of the fingerprint sensor, wherein the feature to be disabled is selected from a set of different features of the fingerprint sensor based on the operating state of the computing device.

2. The non-transitory machine-readable storage medium of claim **1**, wherein selectively enabling the power button includes disabling the power button based on the operating state of the computing device.

3. The non-transitory machine-readable storage medium of claim **2**, wherein:

the fingerprint data includes a duration of the finger touch at the fingerprint sensor device; and

the processor is to disable the power button when the duration of the finger touch is within a range corresponding to a fingerprint scan and the computing device is in a full-power state.

4. The non-transitory machine-readable storage medium of claim **2**, wherein the processor is to disable the power button when the computing device is in a full-power state and the fingerprint sensor is in a ready-to-capture state.

5. The non-transitory machine-readable storage medium of claim **1**, wherein:

the fingerprint data includes a duration of the finger touch at the fingerprint sensor device; and

the processor is to disable the fingerprint sensor when the duration of the finger touch is within a range corresponding to altering the operating state of the computing device and the computing device is in a low-power state.

6. The non-transitory machine-readable storage medium of claim **1**, wherein the processor is to disable a wake-on-fingerprint feature of the fingerprint sensor when a lid of the computing device is closed.

7. The non-transitory machine-readable storage medium of claim **1**, wherein the processor is to disable a scanning feature of the fingerprint sensor when the computing device is in a low-power state.

8. The non-transitory machine-readable storage medium of claim **1**, wherein the processor is to disable a scanning feature of the fingerprint sensor when a single-sign-on setting is enabled and the computing device is in a low-power state.

9. The non-transitory machine-readable storage medium of claim **1**, wherein the set of different features of the fingerprint sensor include a scanning feature and a wake-on-fingerprint feature.

10. A computing device comprising:

a fingerprint sensor device including a fingerprint sensor to read a fingerprint and a power button to alter an operating state of the computing device; and

a controller to:

identify the operating state of the computing device, the operating state including a powered-on state of the computing device;

obtain fingerprint data from the fingerprint sensor device based on a finger touch at the fingerprint sensor device; and

selectively enable the fingerprint sensor based on the operating state and selectively enable the power button based on the operating state to disambiguate the finger touch at the fingerprint sensor device, wherein to selectively enable the fingerprint sensor includes disabling a feature of the fingerprint sensor, wherein the feature to be disabled is selected from a set of different features of the fingerprint sensor based on the operating state of the computing device.

11. The computing device of claim **10**, wherein the operating state includes a login state of a user account associated with the computing device.

12. The computing device of claim **10**, wherein the computing device comprises a display screen, and wherein the operating state includes a power setting of the display screen.

13. The computing device of claim **10**, wherein the set of different features of the fingerprint sensor include a scanning feature and a wake-on-fingerprint feature.

14. A controller comprising:

a pin to communicate with a fingerprint sensor device of a computing device, the fingerprint sensor device including a fingerprint sensor to read a fingerprint and a power button to alter an operating state of the computing device, the operating state including a powered-on state of the computing device; and

a circuit to identify the operating state of the computing device, obtain fingerprint data from the fingerprint sensor device based on a finger touch at the fingerprint sensor device, selectively enable the fingerprint sensor based on the operating state, and selectively enable the power button based on the operating state, to disambiguate the finger touch at the fingerprint sensor device, wherein to selectively enable the fingerprint sensor includes disabling a feature of the fingerprint sensor, wherein the feature to be disabled is selected from a set of different features of the fingerprint sensor based on the operating state of the computing device.

15. The controller of claim **14**, wherein the pin includes a general-purpose input/output (GPIO) pin to selectively enable the fingerprint sensor of the fingerprint sensor device or the power button of the fingerprint sensor device.

16. The controller of claim **15**, wherein the controller comprises another pin to receive the fingerprint data from the fingerprint sensor device, and wherein the circuit uses the fingerprint data to determine when to selectively enable the fingerprint sensor of the fingerprint sensor device or the power button of the fingerprint sensor device.

17. The controller of claim **14**, wherein the set of different features of the fingerprint sensor include a scanning feature and a wake-on-fingerprint feature.

* * * * *